

**Dear Reader** I am the sagacious king's helper. Can you help me help the king? The king is planning a profound design to be made at the top of the central tower of our town's castle. That rooftop terrace is square, and the design will cover a circle inscribed in that square. I need to know how much marble tile I need to make the design. The length of the full side of the castle, from outer corner to outer corner, is 38 metres. The

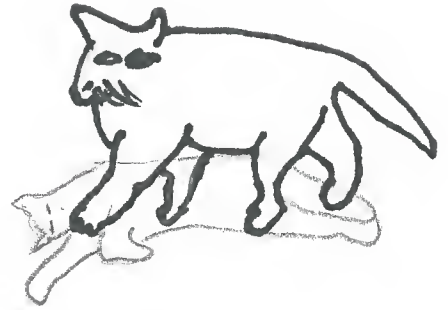
total area of the tops of the four outer towers is  $225\text{m}^2$ .  
How many square metres of marble tile do I need?

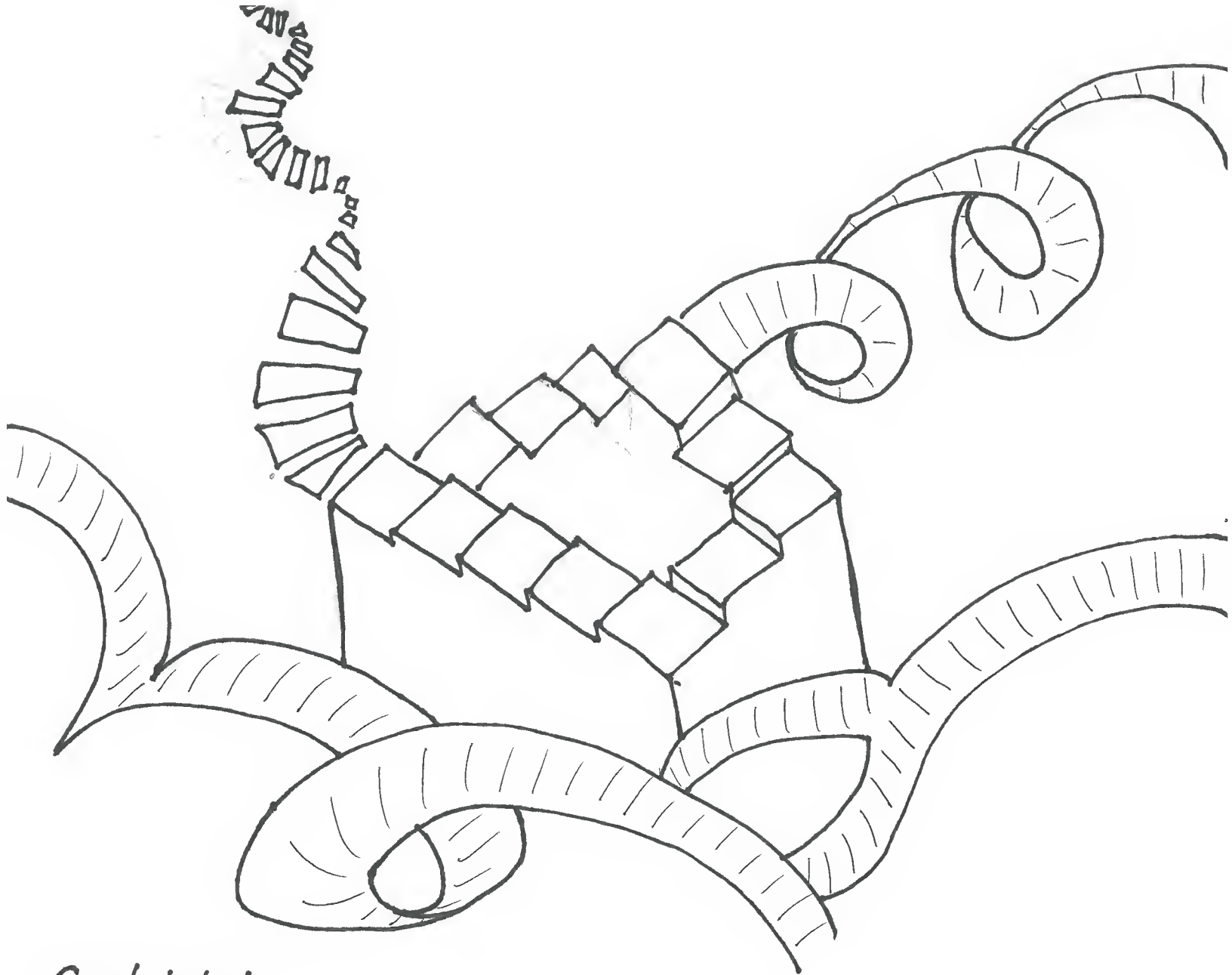
If you think I should buy about 51 metres squared of marble tile **go to page 3.**

If you think I should buy about 26 metres squared of marble tile **go to page 5.**

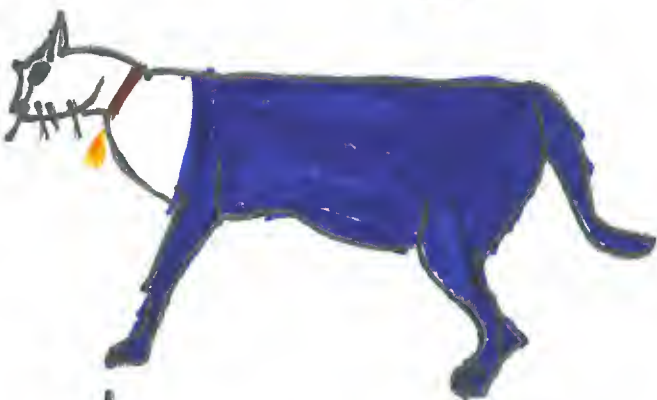
If you advise me to purchase a different amount then find a helper to help you and try again.

chasing cats...  
indefinetly...  
and Ever...  
forever.





**Gratulation!** At the stonemasons, I pick up the correct amount of colored marble. Along with some helpful laborers, I make my way upwards along the winding steps inside the central tower. About half way up, is a man-standing, frowning, mumbling to himself, very apparently annoyed. He can't find the key to the door leading to the upper levels of the tower. I will help him find the key.



"I know the key is in one of the shells of the cat's collars," said the man. But I forget which cat it is. "I know my cat was the heaviest one in the tower. But then the mice came and, ochöin fhein!, the cats ate the mice! There were 60 mice. The 50% colored cat ate  $\frac{1}{4}$  of them and now weighs 19 kilograms. The  $\frac{3}{4}$  colored cat ate  $\frac{1}{3}$  of the mice and now weighs

28 kilograms. The white cat ate  $\frac{1}{5}$  of the mice and now weighs 19 kilograms, and the wholly colored cat didn't have any mice and weighs 6 kilograms. Finally, the 25% colored cat ate a sixth of the mice and now weighs 20 kilograms. ochöin fhein! Can you help me?

If I go for the 25% cat, go to page 9

If I go for the 75% cat, go to page 2

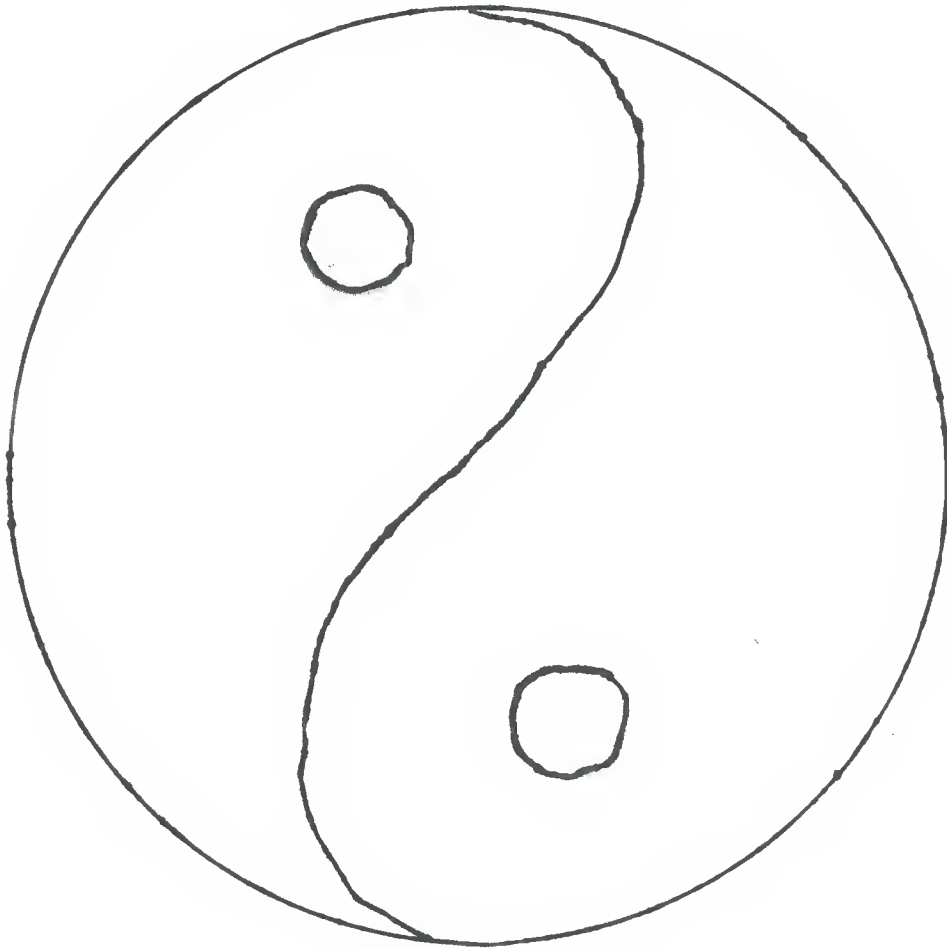




Unfortunately I've chosen the wrong answer. Perhaps I mustof gotten the perimeter of the circle rather than the area. Or did I remember to get the square's area and side length first? Ahhhh! 225! 4 squares squared! Central tower outside towers! Rooftops in the rain! Where am I? How much time has past? Here I am going round and round in circles, but actually hitting the brick wall of hard math! Kol tuv!

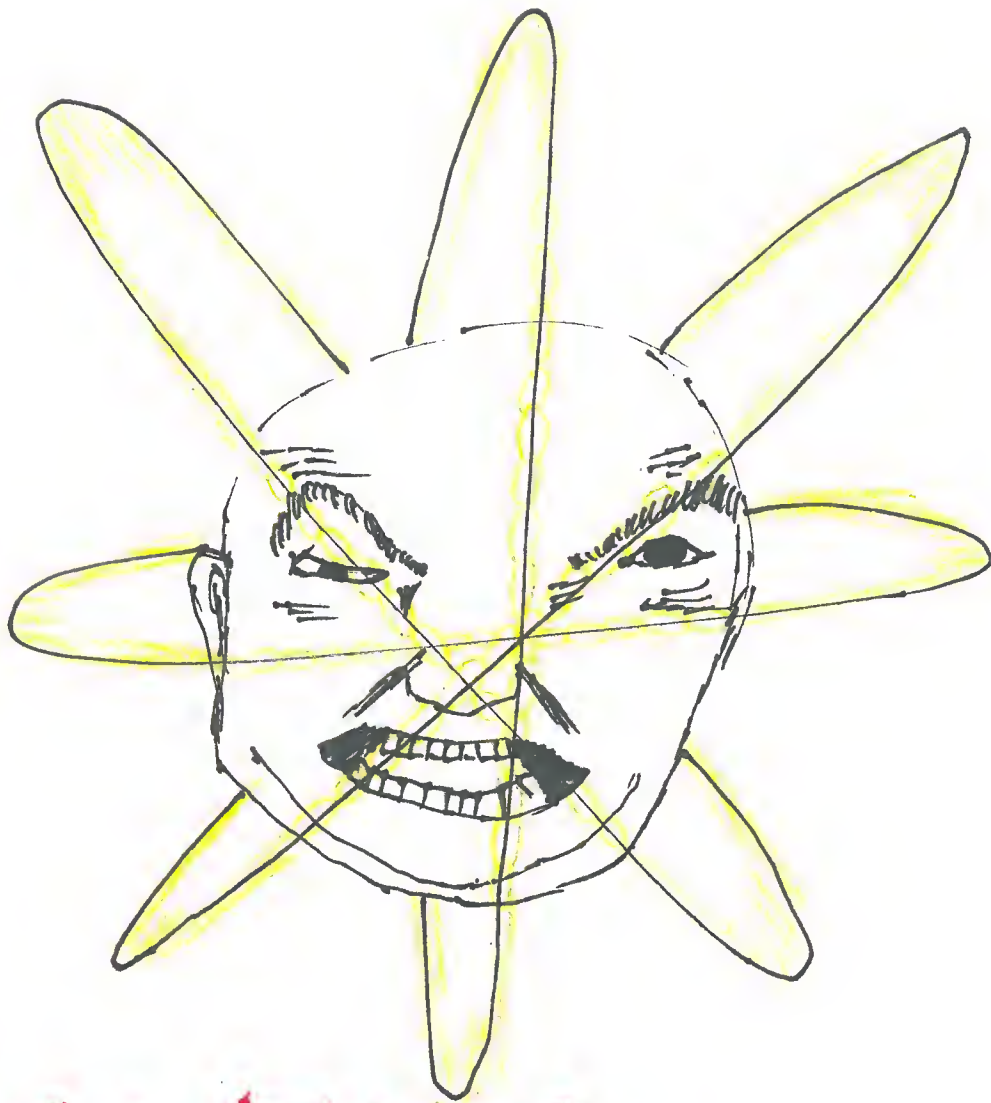


Correct a mundo! At last, I've made it to the rooftop tower terrace! Now to lay down the marble, to follow the king's magnificent plan- if I get this right, he will be so pleased! What is this new symbol he's made?



I have two colors: red and blue. In how many unique ways can I arrange the colors so that no color is bordering itself?

If there is one way, go to page eleven.  
If there are two ways, go to page eight.



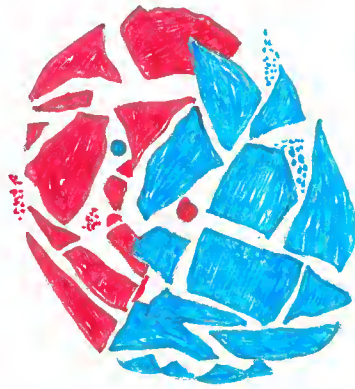
**ИЕТИ!**

I've made a miscalculation!

Oh, NO! If I made a miscalculation, we're lost in the book forever! Me and the guard can't get out of the shells of the atom!

# Oh No!

after lugging all that  
marble up to  
the top of  
the tower,  
we messed  
up the design.



Something is not right.

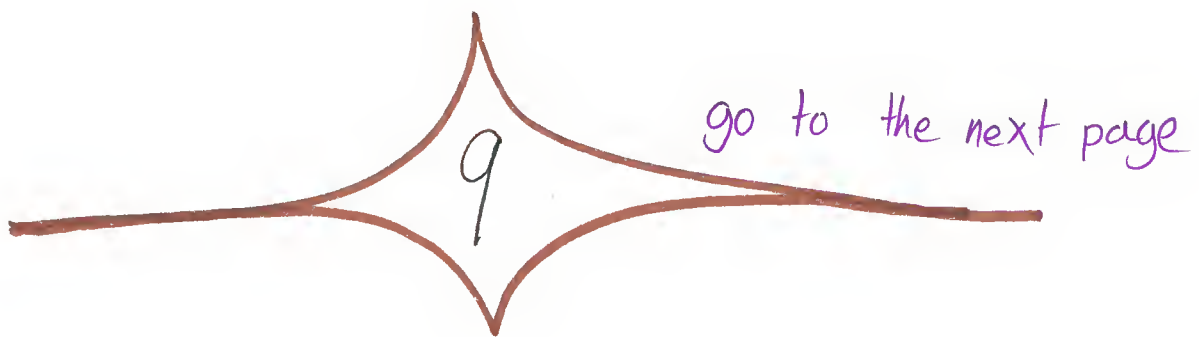
It's all helter-  
skelter. The  
marble  
is uneven,  
we lost the  
balance.



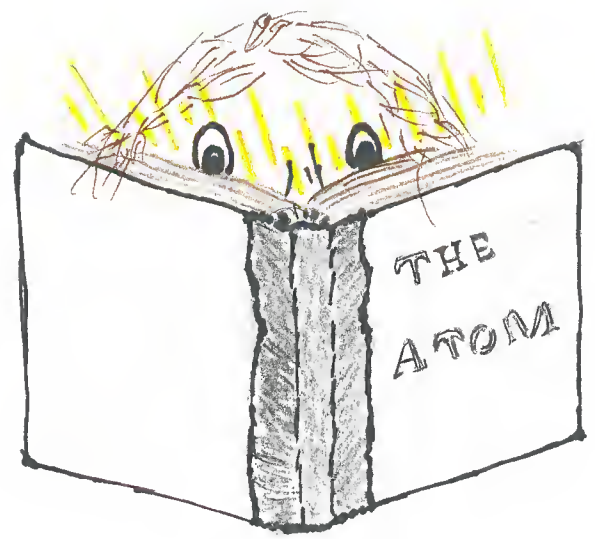




Omedito gozaimas! You chased the right cat and got the key! "I figured that the key was in the shell on the collar." I said, "I know your brain might be tired of thinking, but there's a long way to go."



I arrive at the entrance to the rooftop terrace, only to find the guard is lost in a book. He is in a world of shooting electrons and vast empty spaces. Waves that are points, points that are waves, all going, all inside the shells of an atom. He's been sucked in by the lure of gold, and now he's lost in a labyrinth of electrons. Can you help me rescue him?



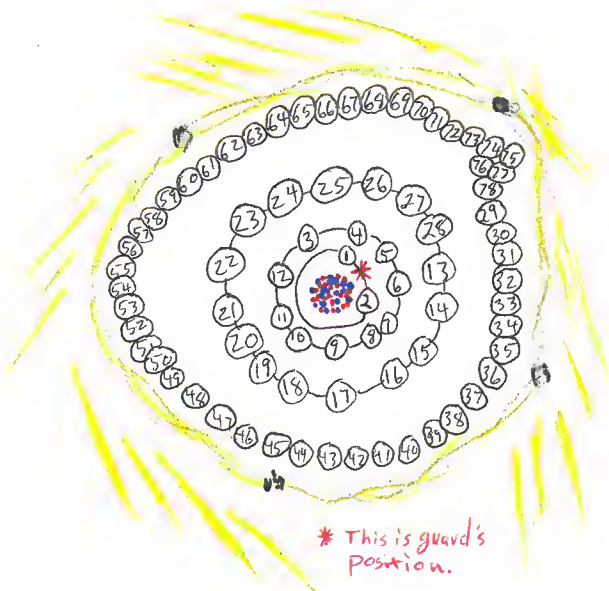
Step 1:

jump onto a multiple of three on the second shell

Step 2: divide by two

(and you can't use decimals) and multiply that number by four. jump onto that number on the second shell too.

Step 3: divide that number by three and multiply it by ten. Subtract eleven. double it. Now add one squared to it. Add the two digits and subtract that answer from the number.



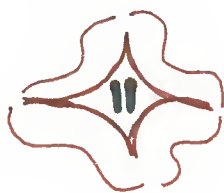
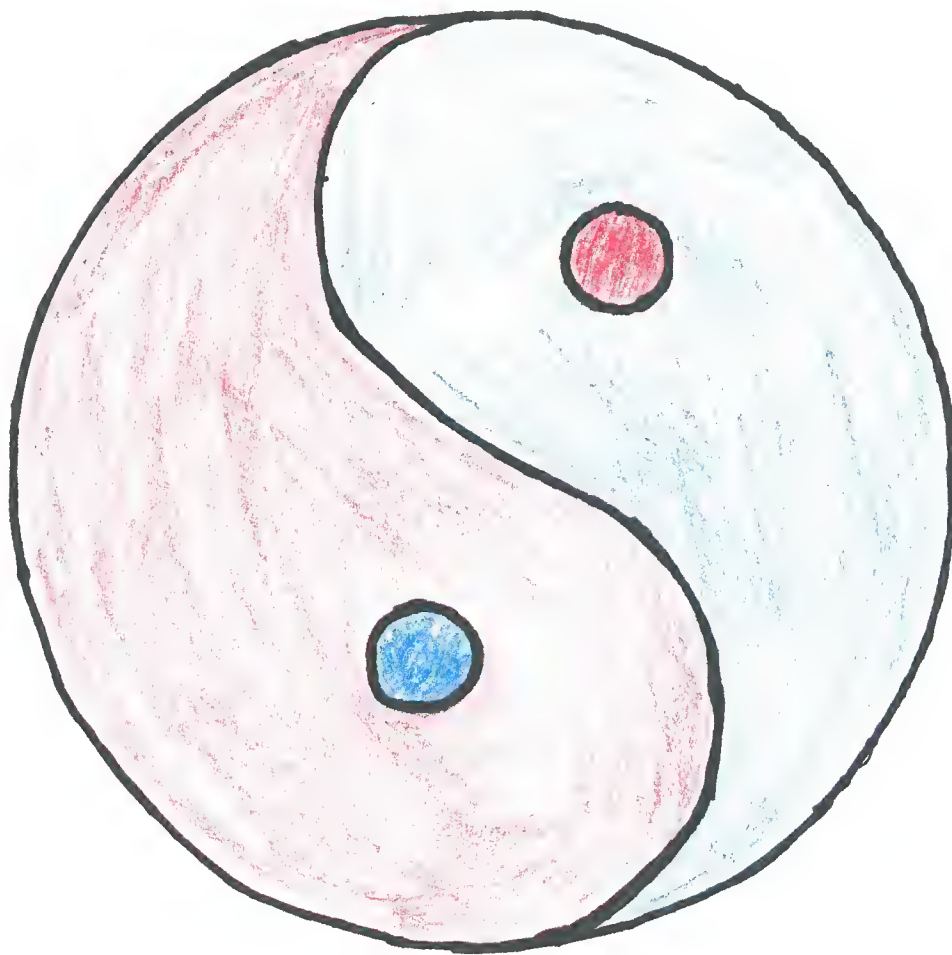
Was the path out of the atom 6-12-45?  
if so, go to page 6.

Was the path out of the atom 6-12-54?  
if so, go to page 7.

If you found a different path, try again.

~ONE~

is the answer





I am pleased with this new symbol. And your help has been invaluable.

**THE HELPER**

It is both beautiful and simple. I think it will bring you wisdom and peace.



Thank you, Dear Helper. But though I do wish to guide our people in both peace and wisdom, the design is not for mine eyes alone.

**THE HELPER**

But who else can behold it, atop its high tower?



Yes. Who indeed? While all eyes seek to look up, who will, in kindness, look down?

## Answer Key

- **Tower Top** : As viewed from the sky, here is the tower.



$$1 + 2 + 3 + 4 = 225 \text{ m}^2$$

Area of a circle =  $\pi r^2$

- **Chasing Cats** : Perhaps this chart will help.

original weight	?	?	?	?	?
% colored	0%	25%	50%	75%	100%
# of mice	$\frac{1}{5} = 12$	$\frac{1}{6} = 10$	$\frac{1}{4} = 15$	$\frac{1}{3} = 20$	0
new weight	19	20	19	28	6

- **Lost in a Book** :  $6 \div 2 \times 4 = 12$

$$12 \div 3 \times 10 - 11 = 29$$

$$29 + 29 = 58 + 1^2 = 59$$

$$5 + 9 = 14, 59 - 14 = 45$$

- **Yin and Yang** : From all points of view, the answer is ONE.